SYMBOLS AND ABBREVIATIONS

The following list some symbols and abbreviations used in the course. Do not attempt to memorize them now! Their meaning and uses will become obvious as the course progresses.

DWL	Design water line
FP or F_P	Forward perpendicular
⋔	Midships
AP or A_P	Aft perpendicular
LPP or L_{PP}	Length between perpendiculars (ft)
LOA	Overall length (ft)
K	Keel
D	Depth (ft)
T	Draft (ft)
T_{fwd}	Draft at FP (ft)
T_{aft}	Draft at AP (ft)
T_m	Mean Draft (ft)
Trim	Trim = T_{aft} - T_{fwd} (ft)
δ_{Trim}	Change in Trim
B	Beam (ft)
₵	Centerline
₿	Baseline
WL	Waterline
A_{wp} or WPA	Waterplane area (ft^2)
$A_{section}$ or A_{sect}	Sectional Area (ft^2)
∇	Submerged volume of the ship (ft^3)
Δ_S	Displacement (weight of the ship) (LT)
w	weight of an object (LT)
	(+ weight added, - weight removed)
G	Center of Gravity of ship
	(g = center of gravity for an object)
KG	Distance from keel to the center of gravity of ship (ft)
Kg or kg	Distance from keel to the center of gravity of any object (ft)
TCG	Transverse Center of Gravity (Distance from the ₵ to the Center of Gravity) (ft)
	(+ stbd, - port)
Tcg or tcg	Transverse center of gravity of any object (ft). Measured from the centerline
LCG	Longitudinal Center of Gravity (Distance from Longitudinal reference to the Center of Gravity) (ft)
	(+ fwd of midships, - aft of midships)
lcg	Longitudinal center of gravity of object (ft)
F	Center of Floatation

LCF	Longitudinal Center of Floatation (ft)
	(+ fwd of midships, - aft of midships)
TCF	Transverse Center of Floatation (ft)
	(+ stbd, - port)
B	Center of Buoyancy
LCB	Longitudinal Center of Buoyancy (ft)
	(+ fwd of midships, - aft of midships)
TCB	Transverse Center of Buoyancy (ft)
	(+ stbd, - port)
KB or VCB	Distance from keel to the center of buoyancy (ft)
M_T	Transverse Metacenter
M_L	Longitudinal Metacenter
TPI	Tons per inch immersion (LT/in)
MT1"	Moment to trim one inch (ft-LT/in)
KM_L	Distance from keel to longitudinal metacenter (ft)
KM_T	Distance from keel to transverse metacenter (ft)
GM_T	Transverse Metacentric Height (distance from transverse metacenter to Center of Gravity) (ft)
	(+ M is above G, - M is below G)
BM_T	Transverse Metacentric radius (ft)
ϕ	angle of heel or list (degrees)
θ	angle of trim (degrees)
P	Pressure (psi)
ρ	Density (lb-s^2/ft^4)
g	Acceleration due to gravity
F_B	Buoyant Force (LT)
d_{fwd}	Distance from FP to F (ft)
d_{aft}	Distance from AP to F (ft)
δT_{PS}	Change in draft due to parallel sinkage (ft)
δT_{fwd}	Change in draft forward (ft)
δT_{aft}	Change in draft aft (ft)
RM	Righting moment (LT-ft)
GZ	Righting arm (ft)
FSC	Free surface correction (ft)
I_t	Transverse Second Moment of Area (ft^4)
I_L	Longitudinal second moment of area (ft^4)
GM_{eff}	Effective Metacentric Height (ft)
σ	stress (psi)
	(Tensile-Compressive or Bending)

σ_y	yield strength (psi)
UTS	Ultimate Tensile Strength (psi)
ε	strain (in/in)
E	Elastic Modulus or Young's Modulus or Modulus of Elasticity (psi)
e	elongation (in)
VT	Visual testing
PT	Dye penetrant testing
MT	Magnetic particle testing
RT	Radiographic testing
UT	Ultrasonic testing
BHP	Brake Horsepower (HP)
SHP	Shaft Horsepower (HP)
DHP	Delivered Horsepower (HP)
THP	Thrust Horsepower (HP)
EHP	Effective Horsepower (HP)
η_H	Hull Efficiency
η_P or PC	Propulsive Efficiency or Propulsive Coefficient
R_T	Total Hull Resistance (lb)
V_S	Ship Speed (ft/s)
S	Wetted surface area of the submerged hull (ft^2)
C_T	Coefficient of Total Hull Resistance (R_T)
C_V	Coefficient of Viscous Resistance
C_F	Coefficient of Skin Friction
C_W	Coefficient of Wave Making Resistance
C_A	Correlation Allowance
R_n	Reynolds Number
F_n	Froude Number
ν	Kinematic Viscosity (ft^2/s)
K	Form Factor
λ	Scale Factor
V_A	Speed of Advance (ft/s)
V_W	Speed of the Wake (ft/s)
$\eta_{propeller}$	Propeller Efficiency
A_0	Blade Area (ft^2)
C_t	Coefficient of Thrust Loading
ω	Frequency (rad/s)

ω_n	Natural frequency (rad/s)
ω_w	Wave frequency (rad/s)
ω_e	Encounter frequency (rad/s)
ω_{heave}	Natural Heave frequency (rad/s)
ω_{roll}	Natural Roll frequency (rad/s)
ω_{pitch}	Natural Pitch frequency (rad/s)
T_{roll}	Period of Roll (s)